Name _____

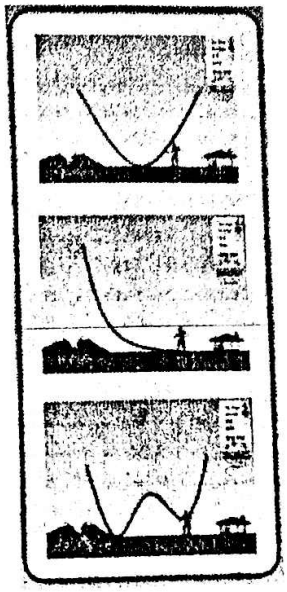
Physical Science

Name: _____

DSHS 11-12

Mr. Tima

Energy Skate Park



Go to **Progress Book/ Homework Page** and **Click** on the *Energy Skate Park* Link or…

http://phet.colorado.edu/en/simulation/energy-skate-park-basics

- Open Energy-Skate-Park and play with some of the settings for about 5 minutes to see what the different options do.
- Once you are done reset the program to its original setting.
- Click on the 1st Energy ramp picture in the upper left corner.
- Next click on the **GRID** button to display your grid lines.
- Now click on the **BAR GRAPH** button to display your energy bar graph.

Draw your energy bar graph for three different positions of the skater.
(Use the Play/ Pause Button at the bottom of the page to help)

Position:
(TOP: approx 6m)

KE PE ME

Position:
(Half way down)
(approx 3m)

KE PE ME

Position:
(BOTTOM: 0m)

KE PE ME

3 POINTS

Click on the 2nd Energy ramp picture in the upper left corner and draw your energy bar graph for three different positions of the skater.

Position:
(TOP: approx 8m)

KE PE ME

Position:
(Middle: approx 4m)

KE PE ME

Position:
(BOTTOM: 0m)

KE PE ME

3 POINTS

Click on the 3rd Energy ramp picture in the upper left corner and draw your energy bar graph for three different positions of the skater.

Position:
(TOP: approx 5m)

KE PE ME

Position:
Top of the 2nd Hill
(approx: 3m)

KE PE ME

Position:
(Bottom of 2nd Hill)
(approx 1m)

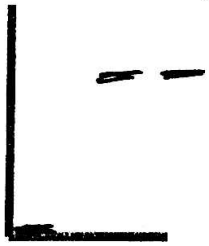
KE PE ME

3 POINTS

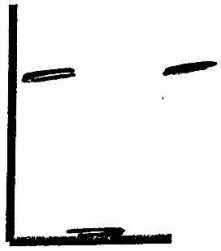
Nat **Physical Science** DSHS 11
Name: _____ Mr. Tim
ame: ___
riod: ___

Now, go back to the 1st graph. What does your graph look like if you place the skater at the top of your skate ramp when your skater is at the very bottom of your ramp?

Position: TOP (Start at the Top)



Position: BOTTOM (Run the man to the bottom)



2 POINTS

How does the Kinetic energy (KE) and potential gravitational energy (PE) compare to the total energy (ME) for every situation?

1 POINT KE & PE ADD UP TO ME → ME DOES NOT CHAI

Show an equation that signifies this relationship for total energy (ME):

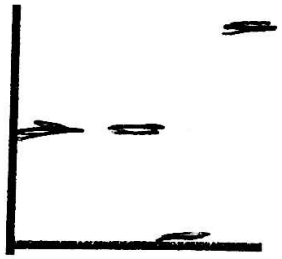
1 POINT ME = KE + PE

Now go to the top of the simulation and click on the **FRICTION** tab.

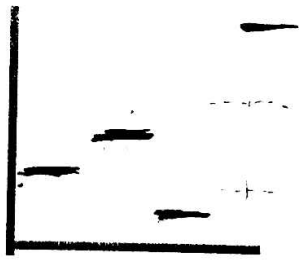
- Turn friction **ON.**

Draw your energy bar graph for three different levels of friction for the skater.
(HALF WAY DOWN THE HILL)
(Use the Play/ Pause Button at the bottom of the page to help)

No/ NONE: (Approx 3m)



Medium:



High/ LOTS:

3 POINTS

Quick Check Questions:

1. What is another name or term we could use for TE?

1 POINT HEAT ENERGY = TE = THERMAL ENERGY

2. If we make the simulation look like what we would experience here on earth where there is friction, why do we all of a sudden begin to loose kinetic (KE) and potential (PE) energy?

1 POINT FRICTION TURNS KE INTO HEAT ENERGY / THERMAL ENERGY

PLEASE COMPLETE THE ENERGY PROBLEMS ATTACHED FOR HOMEWORK.

18 + 2 POINTS FOR BEING ON TASK

20
20

Mr. Tima

Energy Problems

1. What is the potential energy of a 2-kilogram potted plant that is on a 1 meter-high plant stand?

GIVEN	WORK	ANSWER
$m = 2kg$ $h = 1m$ $g = 9.8 m/s^2$	$GPE = m \cdot g \cdot h$ $GPE = 2(9.8)(1)$	$19.6J$

4pt

2. What is the kinetic energy of a 3-kilogram ball that is rolling at 2 meters per second?

GIVEN	WORK	ANSWER
$m = 3kg$ $V = 2 m/s$	$KE = \frac{1}{2}mv^2$ $KE = \frac{1}{2}(3)(4)$ $KE = \frac{1}{2}(3)2^2$ $KE = 6J$	$6J$

4pt

3. The potential energy of an apple is 6.00 J. The apple is 3.00-meters high. What is the mass of the apple?

GIVEN	WORK	ANSWER
$GPE = 6J$ $h = 3m$ $g = 9.8 m/s^2$	$GPE = m \cdot g \cdot h$ $6 = m(9.8)(3)$ $\frac{6}{29.4} = m$ $6 = m(29.4)$ $0.20 = m$	$0.20kg$

4pt

4. Two objects are lifted by a machine. One object had a mass of 2 kg, and was lifted at a speed of 2 m/s. The other had a mass of 4 kg and was lifted at a rate of 3 m/s.
   a. Which object had more kinetic energy while it was being lifted?

GIVEN	WORK	ANSWER
obj 1 = $m = 2kg$, $v = 2m/s$ obj 2 = $m = 4kg$, $v = 3m/s$	$KE_1 = \frac{1}{2}mv^2 \Rightarrow \frac{1}{2} \cdot 2 \cdot (2^2) = 4J$ $KE_2 = \frac{1}{2}mv^2 \Rightarrow \frac{1}{2} \cdot 4 \cdot (3^2) = 18J$	object #2

4pt

   b. Which object had more potential energy when it was lifted to a distance ~~of 10 meters~~ obj 2?

$GPE = m \cdot g \cdot h$ obj 1

$2kg \cdot 9.8 m/s^2 \cdot 10m = 196J$ $4kg \cdot 9.8 m/s^2 \cdot 10m = 392J$

4pt

5. You are on roller blades on top of a small hill. Your potential energy is equal to 1,000 joules. The last time you checked your mass was 60.0 kilograms.
   a. What is the height of the hill?

GIVEN	WORK	ANSWER
$GPE = 1000J$ $m = 60kg$ $g = 9.8 m/s^2$	$GPE = m \cdot g \cdot h$ $h = \frac{1000}{588}$ $1000 = 60 \cdot 9.8 \cdot h$	$1.7m$

4pt

If you have time go back and click on Track Playground and have some FUN.

Design best track you can with at least: One loop, One jump, and One change in Direction

GOOD LUCK!

24 pts